Answer for Mathletics worksheet G4 (p.37-40)

## Calculating – multiplying decimals by 10, 100 and 1000

When we multiply by 10 the number becomes larger by 1 place value.
When we multiply by 100 the number becomes larger by 2 place values.
When we multiply by 1 000 the number becomes larger by 3 place values.
Look what happens to 45.216 when we apply these rules:

**45.216 × 10 = 452.16** **45.216 × 100 = 4521.6** **45.216 × 1 000 = 45216**

**1** **Warm up with these. Work with a partner and a calculator. Predict your answers to the following then try out the problems. Your answers will be one or more of the following. The first one has been done for you.**

tens | tenths | hundredths | units

What place values are in your answers? Multiply by 10:

a these units: 6, 3, 1 ..... *We get 60, 30, 10 (tens)*

b these tenths: 0.6, 0.3 and 0.1 ..... *We get 6, 3, 1 (units)*

c these hundredths: 0.06, 0.03 and 0.01 ..... *We get 0.6, 0.3, 0.1 (tenths)*

d these units and tenths: 1.6, 2.3 and 3.4 ..... *We get 16, 23, 34 (tens and units)*

e these tenths and hundredths: 0.16, 0.23, 0.31 and 0.49 .. *We get 1.6, 2.3, 3.1, 4.9 (units and tenths)*

**2** **Multiply these decimals by 10, 100 and 1000. Estimate first.**

| | × 10 | × 100 | × 1000 |
|---|---|---|---|
| 0.5 | 5 | 50 | 500 |
| 0.25 | 2.5 | 25 | 250 |
| 0.37 | 3.7 | 37 | 370 |
| 1.2 | 12 | 120 | 1 200 |
| 7.34 | 73.4 | 734 | 7 340 |

**3** **Estimate, then calculate the answers:**

a 10 × 0.7 = 7 b 100 × 0.9 = 90 c 10 × 0.3 = 3

d 100 × 0.15 = 15 e 1000 × 0.27 = 270 f 100 × 0.45 = 45

g 100 × 0.255 = 25.5 h 10 × 0.555 = 5.55 i 1000 × 0.178 = 178




## Calculating – dividing decimals by 10, 100 and 1000

When we divide by 10 the number becomes smaller by 1 place value.
When we divide by 100 the number becomes smaller by 2 place values.
When we divide by 1000 the number becomes smaller by 3 place values.
Look what happens to 45 when we apply these rules:

**45 ÷ 10 = 4.5** **45 ÷ 100 = 0.45** **45 ÷ 1000 = 0.045**

**1** **Divide these numbers by 10, 100 and 1000. Estimate first.**

| | ÷ 10 | ÷ 100 | ÷ 1000 |
|---|---|---|---|
| 50 | 5 | 0.5 | 0.05 |
| 25 | 2.5 | 0.25 | 0.025 |
| 37.2 | 3.72 | 0.372 | 0.0372 |
| 48.5 | 4.85 | 0.485 | 0.0485 |
| 542 | 54.2 | 5.42 | 0.542 |

**2** **Estimate, then calculate the answers:**

a 72 ÷ 10 = 7.2 b 48 ÷ 1000 = 0.048 c 35.2 ÷ 100 = 0.352

d 92.05 ÷ 10 = 9.205 e 345.7 ÷ 1000 = 0.3457 f 55.07 ÷ 100 = 0.5507

**3** **You'll work with a partner for this activity. You'll also need a calculator. Take turns giving each other a decimal number to transform.**

a Give them the starting number and the number you want it to become.

b Your partner then has to do so in one move on the calculator, dividing by either 10, 100 or 1000.

c If they can do so, they score 10 points. If they get it wrong, you score 10 points. If you give them a problem that can't be solved by dividing by 10, 100 or 1000, they score the 10 points.

d Swap roles. First person to 50 points wins. Record the numbers below:

*Answers will vary.*

## Calculating – multiplying decimal fractions

How do we multiply decimal fractions using a written strategy?
First we estimate: 5 × 3 = 15. Our answer will be around 15.
3 × 5 tenths is 15 tenths. We rename this as 1 unit and 5 tenths.
We write the 5 in the tenths column and move the unit to the units column.
3 × 4 is 12. We also add the 1.
3 × 4.5 = 13.5
We check the answer against our estimate. Do they fit?

| | | |
|---|---|---|
| | $^{1}4$ | . 5 |
| × | | 3 |
| | 1 3 | . 5 |

**1** **Multiply these decimal fractions:**

**a**

| | $^{1}2$ | . 6 |
|---|---|---|
| × | | 2 |
| | 5 | . 2 |

**b**

| | $^{2}3$ | . 7 |
|---|---|---|
| × | | 4 |
| | 1 4 | . 8 |

**c**

| | $^{1}5$ | . 2 |
|---|---|---|
| × | | 5 |
| | 2 6 | . 0 |

**d**

| | $^{3}8$ | . 4 |
|---|---|---|
| × | | 8 |
| | 6 7 | . 2 |

**e**

| | $^{1}1$ $^{1}4$ | . 5 |
|---|---|---|
| × | | 3 |
| | 4 3 | . 5 |

**f**

| | $^{3}2$ $^{3}4$ | . 5 |
|---|---|---|
| × | | 7 |
| | 1 7 1 | . 5 |

**2** **Now try these:**

**a**

| | 3 | . $^{1}2$ 3 |
|---|---|---|
| × | | 4 |
| | 1 2 | . 9 2 |

**b**

| | 5 | . 3 3 |
|---|---|---|
| × | | 3 |
| | 1 5 | . 9 9 |

**c**

| | $^{3}8$ | . $^{1}4$ 2 |
|---|---|---|
| × | | 8 |
| | 6 7 | . 3 6 |

**d**

| | $^{2}7$ | . $^{2}4$ 4 |
|---|---|---|
| × | | 6 |
| | 4 4 | . 6 4 |

**e**

| | $^{1}6$ | . $^{3}2$ 8 |
|---|---|---|
| × | | 4 |
| | 2 5 | . 1 2 |

**f**

| | $^{3}3$ | . $^{4}4$ 5 |
|---|---|---|
| × | | 8 |
| | 2 7 | . 6 0 |

**3** **Use the templates to set up and solve these money problems:**

**a** Yasmin buys 3 cartons of choc milk. Each carton costs $2.45. How much money does she spend?

| | $^{1}2$ | . $^{1}4$ 5 |
|---|---|---|
| × | | 3 |
| $ | 7 | . 3 5 |

**b** Lisa buys 4 magazines. Each magazine costs $4.95. How much does she spend on magazines in total?

| | $^{3}4$ | . $^{2}9$ 5 |
|---|---|---|
| × | | 4 |
| $ | 1 9 | . 8 0 |

**c** Omar wants to buy 3 games for his computer. Each game is $14.95. He has saved $45. Does he have enough money?
*Yes*

| | $^{1}1$ | $^{2}4$ . $^{1}9$ 5 |
|---|---|---|
| × | | 3 |
| $ | 4 | 4 . 8 5 |



## Calculating – multiplying decimal fractions

We can also use renaming to multiply decimal fractions. Look at 4 × 3.6:

| | $^{2}3$ | 6 |
|---|---|---|
| × | | 4 |
| | 1 4 | 4 tenths |

3.6 can also be expressed as 36 tenths.
36 × 4 = 144
Then we convert back to decimals:
144 tenths is 14.4

**4** **Rename these decimal fractions then multiply. The first one has been started for you.**

**a** 3 × 2.7 = 8.1
*2.7 is 27 tenths*

| | $^{2}2$ | 7 |
|---|---|---|
| × | | 3 |
| | 8 | 1 |

*3 × 2.7 = 8.1*

**b** 5 × 3.4 = 17.0
*3.4 is 34 tenths*

| | $^{2}3$ | 4 |
|---|---|---|
| × | | 5 |
| | 1 7 | 0 |

*3 × 3.4 = 17.0*

**c** 4 × 9.7 = 38.8
*9.7 is 97 tenths*

| | $^{2}9$ | 7 |
|---|---|---|
| × | | 4 |
| | 3 8 | 8 |

*4 × 9.7 = 38.8*

**d** 7 × 1.9 = 13.3
*1.9 is 19 tenths*

| | $^{6}1$ | 9 |
|---|---|---|
| × | | 7 |
| | 1 3 | 3 |

*7 × 1.9 = 13.3*

**5** **Try these. These numbers have hundredths so we will rename the decimal fractions as hundredths. The first one has been done for you.**

**a** 4 × 6.12 = 24.48
*6.12 is 612 hths*

| | 6 | 1 2 |
|---|---|---|
| × | | 4 |
| | 2 4 | 4 8 |

*4 × 6.12 = 24.48*

**b** 5 × 3.42 = 17.1
*3.42 is 342 hths*

| | $^{2}3$ | $^{1}4$ 2 |
|---|---|---|
| × | | 5 |
| | 1 7 | 1 0 |

*5 × 3.42 = 17.1*

**c** 4 × 9.73 = 38.92
*9.73 is 973 hths*

| | $^{2}9$ | $^{1}7$ 3 |
|---|---|---|
| × | | 4 |
| | 3 8 | 9 2 |

*4 × 9.73 = 38.92*

**d** 7 × 1.94 = 13.58
*1.94 is 194 hths*

| | $^{6}1$ | $^{2}9$ 4 |
|---|---|---|
| × | | 7 |
| | 1 3 | 5 8 |

*7 × 1.94 = 13.58*

**6** **Solve these problems:**

**a** Danielle and her twin brothers are each 1.57 m tall. What is their combined height?
*4.71 m*

**b** Your favourite cereal is on special for $4.55 per box. You wait until your mum is in a weakened state and then masterfully convince her that buying 7 boxes is a great idea. How much will this cost?
*$31.85*

**Unless there's a zero at the end, if I multiply tenths, I will always have tenths in my answer. If I multiply by hundredths, I'll always have hundredths in my answer.**
**It's a good way to check that my answers are right.**